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ABSTRACT

The overall objective of the curriculum development project is to develop a general high school level interdisciplinary course on environment studies. This potential five to ten month course is outlined as follows: ecology, water pollution, air pollution, noise pollution, population, socioeconomic implications, and resource management. The general intended learning outcomes listed are: 1) to understand the changing role of man in Canada with respect to his relationship with the ecosystem; 2) to have a better understanding of the natural and unnatural states of the environment; 3) to understand how an excess or deficiency of materials affects man and the ecosystem; 4) to understand the geographical implication of pollution with reference to physical and political boundaries; 5) to form an inquiry approach to modern simulations; 6) to develop an understanding of the need for a balance between economic and recreational needs of man; 7) to understand the attitudes of people; 8) to learn laboratory techniques applicable; 9) to understand the effect of urbanization in creating an unnatural ecosystem; and, 10) to have the student examine and develop his own value system. The course outlines, concepts, and intended outcomes are included for only the first two units on ecology and water pollution, along with a project status report and the evaluation intentions. (Author/SBE)

ED055015

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SP 001 947

CANADIAN

ENVIRONMENTAL

CONCERNS

June, 1971.

Western Curriculum Project on Canada Studies

ED055015

LOCATION OF PROJECT:

John Taylor Collegiate,

St. James-Assiniboia School Division,

Winnipeg, Manitoba.

BIOGRAPHY

MR. A. S. HELGASON

Mr. A. Helgason was born in 1943 in Winnipeg, Manitoba and received all his formal education in Winnipeg. He attended Kelvin High School and then proceeded to United College for his first year at college, and completed his B. Sc. Degree at the University or Manitoba in 1964. In 1967 he received his B. Ed. degree.

After one year at the Faculty of Education he began teaching at Dominion City. The next year the high school was moved to Emerson where he remained for three years teaching mathematics and science. He then took up a position at John Taylor Collegiate in Winnipeg.

Mr. Helgason enjoys curling, golfing and travelling. During his years at Dominion City and Emerson he coached the high school hockey team and also enjoyed success in curling - winning the club championship two years in a row.

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BIOGRAPHY

MR. A. I. MACIVER

Mr. MacIver was born in Winnipeg, Manitoba in 1941; attended Daniel McIntyre Collegiate (Winnipeg); and graduated with a B. Sc. degree from the University of Manitoba in 1963. Soon after graduation, he embarked on a teaching career at John Taylor Collegiate (Winnipeg) while continuing studies towards a B. Ed. degree received from the University of Manitoba in 1968. He taught Geography, Physical Education and Biology until 1969, at which time he applied for a one year leave of absence and accepted a National Science Foundation Grant from the University of Idaho - Moscow, Idaho. On completion of a Master of Natural Science degree in Biology, he returned once more to Winnipeg.

On August 1, 1971, he will be sailing from Miami, Florida on the Research Vessel Fathom II as a member of a thirty man archaeological expedition to the coast of Nicaragua in the Caribbean. Organized by Fathom Expeditions, Inc. (Venice, California) the research team will be involved in recovering historical artifacts, developing a marine park, carrying out marine studies and documenting and filming the 3 to 4 month expedition.

Mr. MacIver enjoys travel, photography and participation in activities such as hockey, skiing, canoeing and skin-diving - the latter leading to a particular interest in Marine Biology. He is a member of the Science Teachers' Association of Manitoba and the International Oceanographic Foundation - Miami, Florida. The twenty-nine year old bachelor is presently a member of the Biology Department at John Taylor Collegiate.

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BIOGRAPHY

MR. J. A. SAMMONS

Jonas A. Sammons is a 28 year old Social Science teacher at John Taylor Collegiate in Winnipeg. As a child, he grew up in a rural area close to Winnipeg and thus he writes; "The open spaces and countryside surrounding our home always fascinated me and I grew up with a deep interest in the flora and fauna of the region. Urban encroachment in the '60's has destroyed much of this. For me, protection of the environment will be crucial in the '70's". While he was attending University, he spent three summers working with the department of Entomology at the University of Manitoba.

He received his Bachelor of Arts and Bachelor of Education degrees from United College (University of Winnipeg) and the University of Manitoba. While at college, he met his wife, Susan and they were married in '67. She is also a teacher and both have a keen interest in the out-of-doors. Mr. Sammons has taught for three years in secondary schools in Manitoba. This summer, he has received a National Science Foundation grant to continue his studies at the University of Iowa.

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BIOGRAPHY

MR. C. A. WATSON

Mr. Watson was born in Winnipeg, Manitoba, in 1938. He attended Kelvin High School and then entered the University of Manitoba, graduating with a B. Sc. degree in 1963. He then entered the Faculty of Education (summer program) and began his teaching career at Hapnot Collegiate, Flin Flon, Manitoba.

After teaching at Flin Flon for two years, Mr. Watson returned to the University of Manitoba to complete a year of study for his B. Ed. degree in 1966, after which he began his present teaching position at John Taylor Collegiate, St. James-Assiniboia School Division (Winnipeg). He has taught Chemistry, Science, Geography, and is presently teaching B.S.C.S. Biology. Mr. Watson is Chemistry-Biology Department Head at John Taylor Collegiate.

He has been accepted for a National Science Foundation grant this summer to attend the University of Iowa to participate in an Inter-disciplinary Environmental Studies Program, along with team member Mr. Sammons.

Mr. Watson enjoys curling, golfing, fishing, bowling and swimming. He is a member of the Canadian Diabetic Association as he recently found out that he is a diabetic. Mr. Watson is married and has a family of three.

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CONSULTANTS TO THE PROJECT

Although numerous individuals from quite varied disciplines have been contacted with respect to our particular project, only one has been approached as a definite permanent consultant - Dr. G. G. C. Robinson of the University of Manitoba Botany Department. Members of the group feel that other full time professional help is not required at this time. However, arrangements have been made for a great deal of input from outside sources - quite likely others will be sought at a later date.

Dr. Robinson has donated both time and talent to this project by helping to organize, constructively criticize, and reorganize the materials produced on general ecology and water pollution. He has given freely of his ideas with respect to the objectives and rationale for the aforementioned. He has also contributed indirectly since the four members of our team have audited his "Pollution Biology" course (Botany 1.337), in order to gain a more comprehensive background of modern problems; not only locally, but nationally and internationally.

Mr. Wm. (Bill) Soprovich is a "Curriculum Consultant" with the Manitoba Department of Education. Responsible for the initial development of the project, he has since acted and will continue to act, as a resource person for curriculum studies. Mr. Soprovich also functions as a liaison with other Manitoba project groups and educational bodies, as well as Project Canada West personnel.

Dr. W. O. Pruitt of the University of Manitoba Zoology Department has also aided in expanding our scope and understanding of ecological situations by allowing one member of our foursome tc spend one week (March 22-26) studying winter ecology with his graduate class in Manitoba's Whiteshell Provincial Park. As well, he is quite willing to continue acting as a resource person for an area (i.e. winter ecology) that the team feels is of utmost importance.

Much can be done at the high school level in this field and we all agree, that as people living in a northern temperate climate we should have a basic knowledge of the effects of cold and snow conditions on bio-geographical relationships. Perhaps, more important, is knowledge with respect to how man effects these relationships.

It is hoped that there will be a proliferation of educational winter studies in the near future. Our team has attempted to influence development in this direction by presenting developed material via slides and commentary to the teachers of our school division as part of in-service training.

For the sake of brevity, the other people contacted are listed below with a concise résume of the areas of the program they have contributed to or might contribute to:

Dr. T. R. Morrison - Department of Psychology - Faculty of Education - University of Manitoba.

Dr. Morrison teaches Educational Psychology and has a personal interest in environmental studies. Discussions with him helped us to decide on the scope and content of the proposed project. Also, relationships of various portions of the problem were discussed and perhaps put into better perspective.

Dr. R. Gallop - Department of Food Sciences - University of Manitoba.

Dr. Gallop has supplied the team with ample detail on the economic uses of waste materials, recycling methods in industry and problems of food supply for future generations. Much of the material from Dr. Gallop will be incorporated at the latest possible date in order that figures and system be up-to-date.

Dr. J. Gee - Department of Zoology - University of Manitoba.

Dr. Gee had discussed course content, simulation games, population studies and general field work studies with various members of our team. Hopefully, we will speak to him later in more detail with respect to games and field studies. Some of the material on population ecology and general course content has already been put to use.

Dr. Gee has also been guest speaker for Z.P.G. (Zero Population Growth) meetings and has supplied useful information in certain areas.

Mr. P. Kakella - Geography Department - University of Manitoba.

Mr. Kakella has supplied various tapes on material pertinent to the course development. Also, he brought us into contact with Dr. Hare from McGill University.

Dr. K. Hare - Meteorology Department - McGill University (Montreal).

Two of our team members discussed with Dr. Hare the aspects of "Climatology and Ecology in Northern Biomes". The problems of balance (homeostasis) in northern situations, and the effect of man on this balance, were discussed in some detail. This material is directly applicable to our first section on general ecology and the second section on types of pollution and effects of pollution.

Mr. Lloyd Axworthy - Director of Urban Studies - University of Winnipeg.

Problems of population generally and urban problems specifically were discussed with Mr. Axworthy. The discussion led to considerations of curriculum content; this will be apparent in our general course outline. At such time as we are pointedly dealing with urban aspects of the socio-economic and physical problems of populations, and possible answers to those problems, we will be meeting with him again.

Dr. H. D. Hemphill - Director of the Manitoba Museum of Man and Nature.

A brief meeting with Dr. Hemphill established a line of communication which will be extremely beneficial at later stages of the project development. We have been offered aid in project developmental procedures, film development and specialized resource information which can be supplied by the museum staff. An invitation has been extended to our team to come down to the museum and speak with any of the personnel.

The team feels that the quality and number of resource personnel has been quite adequate to this point. Until such time as more hours can be spent on the project (i.e. class timetables to allow group members to meet during daytime hours Monday to Friday), attaining more concentrated outside aid would be a very inefficient operation.

A STATEMENT OF THE PROBLEM SELECTED FOR DEVELOPING CURRICULUM MATERIAL

Initially the proposal was to develop a course at the grade X general level. With changes to be brought about by the CORE Committee report of Manitoba, there will no longer be grade levels in high school but rather levels and phases of achievement.

We feel that our course would fit as an introductory course that could be undertaken by any (and hopefully all) high school students.

Initially our proposal was for a course of two month's duration to be attached at the end of a grade X General Science or Geography Program. The proposal was for an ecological study of the aquatic environment.

The initial proposal did not include some of the basic premises necessary for a study of this kind so we have broadened the base considerably by including air and noise pollution, population, socio-economic problems, and resource management.

Our course content will be outlined in somewhat greater detail later in this report. We are proposing a longer course to allow time to adequately cover a variety of topics. If a semester system (five months) is being employed, the course could be fitted into this time.

Similarly,, if a 10-month school year is being employed, this course could also fit in. With the flexibility of content, a teacher would still have the opportunity to cover specific topics within a two month sequence of time if so desired.

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* COMMITTEE ON THE REORGANIZATION OF SECONDARY EDUCATION IN MANITOBA

A STATEMENT OF THE RATIONALE FOR SELECTION AND DEVELOPMENT OF THE CHOSEN TOPIC

In order to answer the question of what value to Canadian society this curriculum material will be I would like to quote from an article by Charles Ream, "Youth Culture: Humanity's Last Chance". American Personnel and Guidance Journal - May 1971.

> "Even sincere adults in America are finding themselves unable to understand what is making the cutting edge of contemporary youth reject their socialization so vociferously. Some of the "reasons" behind discontent can be articulated by the young people involved, but many are only felt intuitively.
>
> Efficiency and production/consumption are our gods. Magic, mystery, and sacrament are inappropriate. America is instant breakfast, perfumed garbage crushers, drive-in churches, and surgical face lifts.
>
> Most important, we will have to learn to deal with, if not to accept, notions that are radically different from the accepted norms of "American tradition." Try these on for size:
>
> 1. It is impossible to be at once a humanist and a capitalist, since good to the humanist is defined by the welfare and happiness of people and good to the capitalist is defined as the maximization of profit on investment.
>
> 2. Progress must be redefined before we pollute ourselves to death; some system of account must be devised that recognizes social as well as monetary cost.
>
> 3. The nuclear family is not the optimum arrangement for people to live in; it is almost necessarily sexist and severely limits the number of close human relationships available to both growing children and adults.

> 4. People should be allowed to live in vastly different ways; historically, American policy has been "melt into the pot or else!"
>
> 5. The structure of work must be made more flexible and less alienating; all workers, whether in factories, offices, or schools, must have a role in basic decision-making."

The American situation and the American student's plight is not unlike that of Canada's youth. It would seem that there is a need to permit the student to have more control over his life's direction. It is our interest to produce a student centered, action-oriented program for Canadian youth. We will attempt to have a course in which the student can express his ideas through communication and interaction with other students, the teacher, and the community.

A) CANADIAN STUDIES

In order that the course be made relevant to the student, we will be using and developing Canadian materials.

We feel there are unique problems in the Canadian situation and for this reason we feel that although American examples are similar, the problems of Canada must be seen in a Canadian context.

International agreements re pollution control are a thing of the near future and we must be aware of Canada's stand and foreign policy so that we may understand future decisions.

It is not our intent by the term Canadian Studies to conjure up some form of radical nationalism but since we are different and unique, we must examine ourselves as being so.

Since we are North Americans and since we are neighbours to a leading world nation, it is not our intent to exclude their experience but rather to build on it. Indeed, since the individual should see himself as part of a world community, we feel it is necessary to keep the Canadian Studies in a world context.

A great deal of Canadian material suitable for the classroom use already exists but is not being used. Therefore our project will be devoted to designing and developing units for study based on existing secondary sources of information.

B) KEEP ABREAST WITH DEVELOPMENTS IN SOCIETY

We realize that it is almost impossible to keep up with the information explosion on ecology, pollution, and associated problems while composing or creating educational material. It is to be hoped that with the use of the basic threads, the ongoing process may be kept topical at the discretion of the teacher and student.

Course material, or teacher strategy methods have little meaning unless they are relevant and can be assimilated or utilized by the individual.

Therefore, we would see our program of studies as having man in his environment as the central focus. The course must have meaning for the student in his present life space. By this we mean if the student cannot comprehend or accept the basic premises, then our program lacks relevancy. We ourselves realize that what is sometimes relevant to the teacher may not be so to the student since the student has had a different set of experiences.

C) INTERDISCIPLINE APPROACH

Biology and Geography, by their very nature, tend to be eclectic (drawing from several disciplines) and therefore lend themselves more readily to an interdisciplinary approach.

By interdisciplinary, we mean combining information, concepts and those common processes and approaches found in the disciplines of Biology and Geography.

D) ACTION-ORIENTED SOCIAL CHANGE

If the school is an instrument of social change, several of the activities that we hope to propose may come into direct conflict with certain segments of the population in the society.

Many of the things we will attempt to do concern the area of value judgements. The ideas that may be instituted in the future may threaten the basic premise on which society now functions.

Examples: Biological engineering; Corporate morality; Private ownership; Right to have more than two children; or simply let's take the cars off the road and the planes out of the sky so we will have clean air to breathe next year.

Many of the issues will be of a controversial nature and therefore a balanced program will be presented whereby the student can make his own choice as to the direction he chooses to follow.

E) INTERRELATIONSHIPS OF CANADIAN REGIONS

Geographically, Canada may be thought of as a country of distinct regions; therefore, it has problems unique to each region.

Physical geography of North America tends to have a North South pattern.

Political geography of North America forms East West boundaries.

In part, the course will have the student focus on his immediate locality and its environmental concerns and relate his findings to the overall Canadian scene.

Examples: 1) The question of interprovincial rivers and a provincial code regarding Canadian Environmental concerns.

2) International cooperation regarding matters of the environment.

SUMMARY OF RATIONALE

The topics used in the above rationale provide a vehicle by which the student can see himself in relation to Canada and Canadian society. Ream's article points out the need for relevancy in education and some of the reasons for unrest among youth. Our rationale focuses on many of the questions raised by the youth of today. The curriculum will attempt to have students realize that change in Canadian society is inevitable and that an individual can adapt to change. The student, contrary to what he may feel, can become a positive force in bringing about change. By exposing the student to various facets of Canada; the Canadian environment, government, Canadian industry, business and labor, Canadian society, he will be able to realize his own values and relate them to the overall position.

SECTION 7, 8 and 9

A report of related reading and research findings.

A report related to the intended learning outcomes of the curriculum to be developed.

The plans for the structure of the curriculum material to be developed.

These three sections are being combined in our report because they indicate something of the what, why and how of our curriculum materials, what some of the plans are regarding our future development, and generally what this year has been all about.

To begin with, our course on Environmental Studies may be outlined as follows:

(a) Ecology
(b) Water Pollution
(c) Air Pollution
(d) Noise Pollution
(e) Population
(f) Socio-Economic Implications
(g) Resource Management

We have completed and included here a section on the Specific Intended Learning Outcomes for (a) and (b) above and also a section on the proposed course outline for (a) and (b) above.

We have not yet completed the specific ILO's or course outlines for the rest of the sections. However, a portion of the team will be attending a summer institute (National Science Foundation) on Interdisciplinary Environmental Studies during which time they will attempt to complete ILO's and course outlines for the rest of the program as well as gather a wealth of material on pollution from an international viewpoint. In section 12 of this report we discuss some of the difficulties we have encountered, which may help clarify why our study is rather incomplete at this time.

We have, however, included a section on the general intended learning outcomes for the whole Canadian Environmental Concerns program. As you will note, there is much duplication and elaboration in the specific ILO's for the Ecology and Water Pollution sections. Further expansion and explanation will be forthcoming as we complete our specific ILO's for the rest of the program.

In considering the topic of "Environmental Studies" we have looked at many text books in Biology and Geography and programs on Environmental Studies and Oceanography that are already in use. In addition, television, newspapers, and magazines are continually putting out materials on the pollution problem. Also there are many biologists, geographers, and advisors from the University of Manitoba who have helped in the formation of our program. As we go further along in the development of

our program we will be looking closely at Government publications both at the Federal and Provincial level.

In considering the ILO's that we have selected we have decided that in order to emphasize the degraded environment, we should introduce the program with a look at the natural environment and the normal interaction between fauna and flora. With an understanding of nature's realm the student will then be able to fully understand man's interaction in the environment. After considering man's interaction in nature we can then delve into social problems that man is himself creating by his own indifference to the environment and methods of maintaining a habitable environment.

The student will be provided with opportunities to contrast the degraded and natural environments both in the cognitive and affective domains. In addition, the approach provides latitude to Biology, Geography, and the Social Sciences in the following ways:

> The biological aspects of species are maintained by the environment. The environment depends on climate and terrain of the land. The problems of the environment are mainly due to society and the philosophies that societies adhere to.

We propose to evaluate our materials by implementing them in existing programs of biology and geography at different levels to determine their relative merit. The concepts, experiments, and field trips that we propose will be evaluated on the basis of the reactions of the students, their understanding and involvement in the ideas presented.

GENERAL INTENDED LEARNING OUTCOMES: CANADIAN ENVIRONMENTAL STUDIES.

1. To study the Canadian environment.

2. To understand the changing role of man in Canada with respect to his relationship with the ecosystem.

3. To have a better understanding of the environment:

   a) by learning about the natural state.
   b) by learning about the unnatural state (polluted).

4. To understand man's interaction in the ecosystem.*

5. To understand how an excess or deficiency of materials affects:

   a) man
   b) ecosystem

6. To understand the geographical implications of pollution with reference to physical and political boundaries.

7. To form an inquiry approach to modern situations.

8. To develop an understanding of the need for an aimable balance between economic and recreational needs of man.

9. To understand the attitudes of people in different walks of life (industry, wage-earner, government).

10. To understand the economic problems of controlling pollution.

11. To learn laboratory techniques applicable to environmental studies.

12. To understand the effect of urbanization in creating an unnatural ecosystem.

13. To consider the environmental situation with the purpose of having the student examining and developing his own value system.

* * *

*ECOSYSTEM: Together, the physical features of the environment of any given area and all the organisms living in that area constitute an ecological system - usually called an ecosystem for short.

* * *

INTENDED LEARNING OUTCOMES

Ecology Section

Introduction

1. That students understand the term ecology as used in biological and geographical studies.

2. To have students realize that the study of ecology has been with us for some time but has been largely ignored - to foster the philosophy that to ignore it any longer would be sheer folly.

3. Student recognition of the basic organization of biological organisms from cell to complete entity; the complexity of the organization and the interdependancy of the parts of the system.

4. To convey to the students the number and kinds of "life spheres" found on and surrounding the earth.

Ecosystem

5. Student understanding of the structural make-up and interactions of ecosystems.

6. Appreciation (awareness of importance) of the requirements and the limitations that the biotic and abiotic worlds place on each other.

7. To convey knowledge of specific aquatic and terrestrial ecosystems as samples for discussion.

8. To emphasize that the same basic biological relationships (biotic-abiotic) hold true for organisms whether in water, in air, or on land.

9. Student recognition that definite limits of tolerance (both lower and upper) exist within an ecosystem for such biological aspects as food, temperature and water.

10. To have students understand that two factors in the ecosystem may either cancel out each other's effectiveness as an individual factor or may enhance each other's effectiveness. Therefore, complex relationships occur.

11. Normally (i.e. without interference by man) nature controls unbalanced situations in the biological world (maintains homeostasis) by means of starvation, floods and other mechanisms.

12. To have students become aware of the elements and component parts of an ecosystem.

13. Student realization that complexity, diversity, and density of populations affects the stability of biological systems.

Productivity

14. To have students understand what is meant by the term "productivity"; upon which all biological systems depend.

15. Acknowledge the role of light and the process of photosynthesis in their proper setting as the hub of all biological life (reproductivity).

16. Develop student understanding of how biomass productivity is measured in a practical, scientific manner - to have them become aware of the world pattern of distribution.

Bioenergetics

17. To develop an understanding of the complex feeding system for organisms on earth - predator-prey relationships, energy chains and so forth.

18. To have students realize the outcome of breaking these biological food chains - especially at base level.

19. To develop student knowledge relative to the metabolism and growth of organisms, the aspect of overuse, rate of replacement and the Laws of Thermodynamics.

20. To foster further awareness of the importance of complexity and maturity in developing a stable situation - relative to food webs.

Cyclic and Non-Cyclic

21. To provide knowledge regarding nature's recycling schemes(i.e. carbon cycle, nitrogen cycle, hydrological cycle.)

22. To indicate that cycles can only occur at a certain speed, therefore we must not press our use beyond the inherent capabilities of the system.

23. To develop student understanding that (as in all things) there are priorities in nature's system - i.e. macronutrients, micronutrients and non-essentials. Therefore, in solving problems the necessities should be looked to first.

Populations

24. Student appreciations of the importance of characteristics such as density, natality, mortality, growth and age-sex ratios to the over-all well-being of populations - N.B. human trends?

25. Student awareness of the effects of intraspecific and interspecific competition of populations.

26. To develop a respect for nature's many ramifications of control - symbiotic relationships and natural selection - to include the aspect of positive control by nature - negative control by man.

Communities

27. To develop the student's knowledge of climatic effects on biological materials.

28. To introduce the students to Biomes as important, stable bases for populations.

29. Discussion of plant motions leading up to an acknowledgement of photoperiod control and its effect on basic plant productivity.

30. To develop another aspect of nature's Homeostatic control - succession of botanical species.

At this point, the student will have a relatively sound understanding of the working ecosystem in its natural state.

Many other materials could have been included; however, level of difficulty was a decisive factor in determining the content of the ecology section of the course.

ECOLOGY SECTION: COURSE OUTLINE PROPOSAL

Introduction:

A. Definitions of Ecology

B. History of Ecology (from 1749)

C. Levels of organization within the study of ecology - cells, tissues, organs, organ system, organisms, populations, communities, ecosystem and biosphere.

D. Definitions of levels of organization - (Biological Spectrum)

E. Diagram and Interaction Discussion of Stratosphere, Troposphere, Biosphere, Hydrosphere, Noosphere and Littrosphere. (i.e. Life Spheres)

Ecosystem: Basic Unit of Ecology

A. Structural and functional view of ecosystems.

B. Interaction of biotic and abiotic factors in ecology.

C. Discussion of aquatic and terrestrial ecosystems.

D. Laws of - Minimum
- Limits
- Tolerance

E. Factor Interaction (Synergism, antagonism).

F. Combined concepts of Limiting Factors - Homeostasis.

G. Component parts of an ecosystem.

H. Major elements of an ecosystem.

I. Size and Complexity of ecosystems.

Productivity:

A. Aquatic and terrestrial productivity.

B. Light as it relates to productivity.

C. Photosynthesis.

D. Concept of productivity.
- Net productivity.
- Gross productivity.
- Primary productivity.

E. Measuring productivity.

F. World distribution of productivity.

Bioenergetics:

A. Definition of Trophic levels and energy chains.

B. Laws of Thermodynamics.

C. Energy transfer (flow diagrams).

D. Metabolism and growth.

E. Ecological pyramids.

F. Food webs:

- Maturity
- Stability
- Complexity

Cyclic and Non-Cyclic Relationships

Biogeochemical cycles:

A. Hydrological cycle.

B. Carbon cycle.

C. Nitrogen cycle.

D. Phosphorous.

E. Sedimentary cycles.

F. Macronutrients, Micronutrients, Non-essentials.

Populations:

A. General characteristics:

- density, natality, mortality, age-sex rates, growth

B. Intraspecific and Interspecific Competition.

C. Predation.

D. Symbiotic Relationships.

E. Natural Selection.

F. Ecotypes.

G. Speciation.

Communities:

A. Climatology.

B. Major Biomes.

C. Life zones.

D. Photoperiod and ecotypes.

E. Periodism and metabolism.

F. Succession.

G. Species diversity.

INTENDED LEARNING OUTCOMES

WATER POLLUTION

1. To become informed of the present and future water needs of our country.

2. To review the comprehensive standards for water quality as they exist, and as they affect Canada.

3. To consider the multiple uses of water in our environment.

4. To identify pollutants, pollution sources, and effects of pollution as found across Canada.

5. To examine in some detail the standards for water quality.

6. To discover the sources of pollution, and to investigate reasons for the pollution.

7. To discuss the long term and short term effects of pollutants as well as the specific effects of particular kinds of pollutants.

8. To have students become aware of local pollution problems and treatment facilities.

9. To have students become familiar with sampling methods and testing procedures used in identifying pollutants.

10. To discuss better water quality standards and the possible ways in which these standards can be implemented with the minimum problems.

11. To become aware that joint action, preventing pollution, is a necessity.

WATER POLLUTION: COURSE OUTLINE PROPOSAL

INTRODUCTION - Water needs of present and future.
- History of Water Quality Criteria.
- Comprehensive Standards - (WHO) - World Health Organization
- Canadian - International Joint Commission

USE OF WATER

(1) Domestic - check local water status.
(2) Industrial
(3) Agricultural
(4) Recreational
(5) Aquatic life
(6) Water power and navigation
(7) Waste water assimilation and dispersion

POLLUTION - (Identifying Pollutants, Pollution Sources, Effects of Pollution)

(1) a) Standards (water quality)
i Bacterial quality
ii Chemical quality
iii Physical quality
iv Biological quality
v Radiological quality
vi Corrosion and scale characteristics

b) Sewage

(2) Chemicals - radioactive
- pulp mills
- mines

(3) Irrigation, feed lots → Herbicides, Insecticides, Chemical fertilizers

(4) Esthetic, fishing, wildlife, boating, swimming.

(5) Eutrophication

(6) Oil problems, acids, alkali, debris.

(7) Formulation of criteria or standards to meet above six water quality categories.

(8) Cross-country review - the Canadian Scene.

NEED FOR CRITERIA - (Better Water Standards Needed)

(1) Water Pollution Control Authorities (Regulation)

(2) Operating and regulatory personnel (quality to consumer)

(3) Aquatic and marine biologists (programs on protection)

(4) Agriculturists (irrigation and feed lots)

(5) Conservation Authorities (recreation)

(6) Consulting engineers (treatment facilities)

(7) Hydraulic engineers (design and operation)

FUTURE REQUIREMENTS

Need for joint action here (preventive water action)

(1) Physical contaminants
- consolidate for joint action criteria now available.

(2) Toxic materials
- cover direct effect
- cover long and short term effect

(3) Disease-causing constituents
- parasites, bacteria, virus - increase re population density
- develop criteria and lab. techniques

(4) Oxygen-consuming wastes
- determine rivers' capacity - then limit loading

(5) Nutrients
- not only short term - but also long term effects
- evaluate discharges into lakes

POLLUTION

(1) a) STANDARDS i BACTERIAL

- Introduction to bacteria
- Coliform concentration (bacteriological test)
- AWWA - standard for Canada
- Microscope study
- BOD (1 - 5 = very clean - bad (oxygen balance)
- DO
- Pathogens (hepatitis) (dysentry)
- Sewage
  - Free CO_2, NH_3, Suspended solids
- Trip to treatment plant (sewage)
- Primary, Secondary, Tertiary treatment.
- Viral pathogens
- Natural putrifaction vs. overstrained river.

ii CHEMICALS

- Introduction to chemicals
- Organic - source - (industry, sewage)
- Inorganic - source - (industry, sewage)
- Chemical tests

  (several examples)
  - N_2 + O_2 (indicator of organic pollution)
  - $CaCO_3$ (hardness)
  - Chlorine (sterilization)
- Trip to chemical plant
- Chemical Oxygen Demand (COD)
- Treatment facilities
- Prevention methods of pollution
- D.D.T.
- Chlorination and fluoride water treatment
- Tolerance limits.
- Chlorinated hydrocarbons

iii PHYSICAL

- Turbidity
- Color
- T.O.N. (Threshold odor number)
- Taste
- Temperature
- Microscopic and nuisance organisms
- Electrostatic precipitation
- Garbage (tin cans)
- Standards
- Field Trips - collect samples
- Hardness
- pH
- Electrical conductivity

iv BIOLOGICAL QUALITY

- WHO International Standards
- Toxic algae
- Fish study
- Nutrients (phosphate, nitrates)
- Eutrophication (phosphate study)
- Organic pesticides
- Biodegradability - detergents
- Zooplankton - (cyclops) - the pollution indicator
- Oxygen poor env't. - sludge worm, blood worm.
- Field trip - Fisheries laboratory
- "Red Herrings" (Placenta Bay, Newfoundland) - phosphates
- Algal count
- Heavy metals

v RADIOLOGICAL QUALITY

- Standards
- Preventive Methods (source)
- Trip to Pinawa
- Radium 226
- Strontium 90 - milk - cycles
- Radiolsotopes and Radionuclides

vi CORROSION AND SCALE CHARACTERISTICS

- Recommendations - (Ideal quality water)
- Red Water problems
- Distribution problems

POLLUTION

(2) CHEMICALS (INDUSTRIAL)

- (mainly dealt with in Standards)
- Reference to Churchill Forest Industry
- Source of Mercury pollution
- Applying standards to industry
- Pulp and paper pollution - Canada's biggest polluters
- Dow Chemical Company - Lake St. Clair, Ontario (MERCURY)
- Okanagan Lake, British Columbia.

(3) AGRICULTURAL

- Run off and soil loss
- Irrigation
- Feed lots (stock)
- Herbicides (2, 4, 5,-T) (2, 4-D)
- Insecticides
- Pesticides (Parathion) (DDT)
- Chemical fertilizers (Nitrates)
- Fungicides
- Algicides
- Dieldrin and Heptachlor (fireant program)
- New insecticide - Mirex
- Canadian Spruce Budworm Program (disastrous)
- Formula A = R K L S C P (Erosion)

(4) RECREATIONAL

- Esthetic
- Fishing
- Swimming
- Boating
- Algicides on golf course

(5) AQUATIC LIFE

- (mainly dealt with in Standards - Biological)
- Eutrophication

(6) WATER POWER AND NAVIGATION

- Pollutants - acids, alkali, excessive salinity, debris, suspended solids, nutrients, oil.
- Thermal pollution (nuclear power station)

Please keep in mind that a teacher would not be expected to present all of the content cited but would be selecting material according to his situation and locality. The length of his individual program could also be a determining factor in choice of topics to be covered.

In this way, the problems unique to specific Canadian regions can be dealt with more appropriately.

TRANSFERABILITY OF THE CURRICULUM MATERIAL

Development of our materials will keep in mind the flexibility of using materials in any part of Canada. Although Winnipeg is our city, and specific reference may be made to Winnipeg or Manitoba, it is the hope of the team that we will provide a broad enough base that any area of Canada may make use of said program with minor adjustments for local problems.

We realize that all schools, whether urban or rural, have varying facilities and it is with this in mind that we will include activities varied enough to fit one and all.

In addition, each region in Canada has major pollution problems which the student would be able to focus on and study in much greater depth. The course material would be extensive enough that the teacher could select topics that give meaning for the student.

SUGGESTED BUDGET FOR JULY 1, 1971 - JUNE 30, 1972 BUDGET YEAR

Released time for teachers to gather data, develop activities and materials.	$4,500.00
Consultants	1,000.00
Clerical Assistance)	
Materials (books, journals, etc.))	
Material Production)	3,700.00
Sundry (slides, camera work, equipment fund, simulation games))	
TOTAL ESTIMATED COST.....	$9,200.00

A STATEMENT RELATED TO EVALUATION OF THE TEAM'S DEVELOPMENT

Our team was formed in November, 1970. Team leader William Soprovich had submitted a proposal to Project Canada West on water pollution. His proposal was accepted, and it was at this point that he approached several teachers at John Taylor Collegiate with respect to becoming involved in the curriculum project. Two teachers at John Taylor Collegiate joined the project initially along with two other teachers from another school division (Assiniboine South). In December, Assiniboine South School Division withdrew its support, and the team was reduced to three members; Soprovich, Watson and Helgason. It was at this point that two additional teachers from John Taylor Collegiate - Sammons and MacIver - joined the project.

On December 20-22, the initial team members flew to Edmonton to attend a conference. Thus it wasn't until January that the team started to work on the project.

After the team had examined the Soprovich proposal, we decided that the submission "Water Pollution - an Aquatic Approach" was too narrow; thus, we decided to broaden the scope of the project. We decided to include sections on ecology, pollution of water and air, noise pollution, population, socio-economic ramifications, and a concluding section on resource management.

During the months of January, February and March, the team audited a Pollution Biology course given by Dr. G. C. Robinson at the University of Manitoba. Also, the winter months were spent reading and researching material in order to develop background knowledge.

Many hours were spent studying models of curriculum development and general problems in curriculum design. One of the difficulties encountered by this team was its lack of knowledge in following accepted curriculum development lines.

With all groups, a certain amount of time is necessary to explore within the group each other's educational philosophies. When the members understand each other's educational views (what education is trying to achieve), then the group can begin to function productively. Our team was fortunate in that we were able to establish rapport quite quickly. Within a matter of weeks, we were beginning to specialize in certain areas: MacIver - ecology; Watson - water pollution; Sammons - population and socio-economic aspects; and Helgason - socio-economic matters and materials pertaining to the logistics of the group (banking, financial matters, etc.).

One of the major areas for concern was the matter of release time. Support was given by the St. James-Assiniboia School Division; however, problems arose with respect to implementation of substitutes within the school itself for the number of release days required. Both the team and the principal were dissatisfied with this method of handling time away from classes and we feel a more productive procedure must be found if the project is to function properly. The team feels that an extra full time teacher to relieve the individual work loads would be the most satisfactory solution to the problem. However, the administration

has yet to be convinced on this matter and as yet, nothing concrete has been decided - this leaves the project members in a rather difficult position with respect to future planning.

We therefore recommend that this area of release time be looked at very closely with administration and the School Division, that clear guidelines be set out before a team embarks on this method of curriculum development, that problems that may arise from the community (parents) and staff members be openly discussed and understood by both the team and the administration prior to undertaking a project.

The traditional role of the teacher as seen by the community and administrators is for him to be present in his classroom at all times - in order that learning may occur. It is therefore a learning process on the part of the community and the administrators to have their teachers actively involved in the community and in developing materials (e.g. curriculum) outside the classroom. We therefore recommend that an extensive public relations program be instituted in order to place the public in a positive frame of mind, and in order to outline the benefits derived from having their teachers placed in a role other than the traditional one. It is important that the team keep lines of communication open between itself, the administration, and the public.

OUTLINE OF TEAM ACTIVITIES

1970

Nov. 26	Team meeting at 4:00 p.m. at John Taylor Collegiate. Six members involved.
Dec. 2	Interview with Dr. Morrison for all team members.
Dec. 3	Trip to Winnipeg Sewage Treatment Plant - group members and Mr. D. E. Bridge.
Dec. 17	Interview with Dr. Robinson - all four members.
Dec. 21-26	Conference (Project Canada West) in Edmonton for two members.

1971

Jan. 4-April 1	Team audited course on "Pollution Biology" offered at the University of Manitoba. - attended during teacher spares.
Jan. 13	Team meeting for one-half day - all members.
Jan. 14	Team meeting all day - all members.
Jan. 21	Team meeting all day - all members.
Jan. 28	Team meeting all day - all members.
Feb. 2	Meeting with St. James-Assiniboia School Board - evening meeting.
Feb. 4	Team meeting all day - all members.
Feb. 19	Interview with Dr. Hare - two members involved.
Feb. 22-28	Winter Ecology Field Trip for one team member.
Feb. 26-28	Weekend trip to study winter ecology.
March 4	Team meeting all day - all members.
March 12 - 14	Youth Conference on Environmental Studies - two members involved.
March 18	Interview with Dr. Gallop - two members.
March 25	Team meeting all day - all members.

May 14 Team meeting all day - all members.

May 19 Team meeting all day - all members.

June 4 Team meeting all day - all members.

GROUP STUDY OF:

C.B.C. tapes
Books, periodicals
Films
Simulated Games

ORDERS FOR:

Water Pollution Kit
Tilitson Conservation Course Outline
Teachers' Manual on Water Pollution

GENERAL ATTENDANCE:

a) Pollution Probe Meeting

b) Zero Population Growth

c) Manitoba Scientists to Control Pollution.

RE: PROJECT CANADA WEST

We would like to indicate that we have received financial support from the St. James-Assiniboia School Division this year, and also to continue our project next year. We have enclosed four letters which indicate the specific type of support.

a) Payment of substitutes for two members to attend December workshop (2 days).

b) $1600.00 support for release time of project members from September - December, 1971.

c) Payment of substitutes for two members to attend NSF course*in Iowa City commencing June 14, 1971 (13 days each).

d) Payment of a substitute to release one member to attend June workshop in Edmonton.

*Please find attached a copy of the outline of the course on Interdisciplinary Environmental Studies at the University of Iowa.

c.c. Mr. C. A. Watson,
Mr. G. Helgason,
Mr. J. Holland

SUPERINTENDENT
R. A. MACINTOSH
SECRETARY-TREASURER
T. C. MACGREGOR
MAINT. SUPERVISOR
L. D BESTER

The St. James-Assiniboia School Division No. 2
BOARD OFFICE - 2000 PORTAGE AVENUE • ST. JAMES 12 • MANITOBA • PHONE 888-7951

December 4, 1970

Mr. W. Soprovich,
Project Leader,
Project Canada West,
Rm. 411, 1181 Portage Avenue,
Winnipeg 10, Manitoba.

Sir:

Re: December Conference

Please consider this approval for Mr. C. A. Watson and Mr. A. Helgason, both of John Taylor Collegiate, to be absent from school on December 21st and 22nd without loss of pay for the purpose of attending the Project Canada West Conference in Edmonton. It is understood that this Board will cover the cost of substitutes required.

Yours truly,

R. A. MacIntosh,
Superintendent of Schools

RAM/kg

SUPERINTENDENT
R. A. MACINTOSH
SECRETARY-TREASURER
T. C. MACGREGOR
MAINT. SUPERVISOR
L. D. BESTER

The St. James-Assiniboia School Division No. 2
BOARD OFFICE–2000 PORTAGE AVENUE • ST. JAMES 12 • MANITOBA • PHONE 888-7951

February 15, 1971

Mr. D. Bridge,
Principal,
John Taylor Collegiate,
Hamilton & Knox,
Winnipeg 22, Man.

Dear Doug:

Re: Canada West Project

Please inform Messrs. Watson, MacIver, Simmons and Helgason that the Board has approved support for the Canada West Project, for 1971, in the amount of $1600 as requested.

I presume that preparatory work by these teachers is proceeding. I hope that you can see some resolution of the problem related to substitutes. I would appreciate hearing from you if complaints from parents continue.

Best wishes,

Yours truly,

R.A. MacIntosh,
Superintendent of Schools

RAM/mc

c.c. Mr. Chris Breckman

SUPERINTENDENT
R. A. MACINTOSH
SECRETARY-TREASURER
T. C. MACGREGOR
MAINT. SUPERVISOR
L. D. BESTER

The St. James-Assiniboia School Division No. 2

BOARD OFFICE-2000 PORTAGE AVENUE • ST. JAMES 12 • MANITOBA • PHONE 888-7951

April 15, 1971

Messrs. J.A. Sammons &
C. A. Watson,
John Taylor Collegiate,
Hamilton & Knox,
Winnipeg 22, Manitoba.

Sirs:

Re: Your letter of March 23rd

At the meeting of April 13th the St.James-Assiniboia School Division Board approved your request for thirteen days of leave commencing June 14, 1971 without loss of pay. It is understood that this leave will permit you to enrol in a course in environmental studies at the University of Iowa.

I have been asked to advise you that throughout the remainder of the Canada West Project, you endeavor to keep cost to the Board within the amounts specified in your initial presentation to the Board. Incidentally, for items requiring my personal attention, I would appreciate a little more advance notice than was the case in this instance.

Please accept best wishes for interesting and fruitful period of study at Iowa University.

Yours truly,

R. A. MacIntosh,
Superintendent of Schools

RAM/kc

May 13, 1971

Mr. Angus MacIver,
962 Banning St.,
Winnipeg 3, Man.

Sir:

Re: Project Canada West

At the meeting of May 11th the St.James-Assiniboia School Division Board approved your release from teaching duties, without loss of pay, June 23rd - 30th for the purpose of attending the media workshop in Edmonton, Alberta.

I understand that you will see that student assignments and other requirements which may be defined by Mr. Bridge will be covered adequately before your departure.

Best wishes,

Yours truly,

R.A. MacIntosh,
Superintendent of Schools

RAM/mc

c.c. Mr. D.E. Bridge

SECONDARY TEACHERS IN INTERDISCIPLINARY ENVIRONMENTAL STUDIES

NSTITUTE OBJECTIVES

At a time when our students are challenging the concept of adolescence itself, we need to implement courses r units of study that will allow students to participate in lefining, analyzing, and solving the problems of our imes. One method of solving this dilemma is to make he teachers aware of the problems involved and then to rain them to investigate these problems and ultimately o design and implement units of study into an interdisciplinary classroom.

To accomplish these goals it would be the specific intent of this institute to fulfill the following objectives:

a. to increase the teachers' awareness of such societal problems as overpopulation, methods of population control, genetic engineering, drug abuse, etc., through a concentrated literature search and a special lecture series conducted by specialists in this field;

b. to increase the awareness of teachers toward such environmental problems as air pollution, water pollution, sewage disposal, etc., through a special lecture series conducted by specialists in these areas and field trips to nearby cities that are experiencing these problems;

c. to provide an indepth study of the ecology of a relatively unpolluted environment as compared with a similar polluted environment—the Lake Macbride study area and associated Iowa City section of the Iowa river provide such a contrast;

d. to provide the teacher with a better understanding of science and what a scientist does as measured by the *Test on Understanding Science* (TOUS). This experience will be provided for each participant as he identifies with a particular research scientist and ultimately designs and carries out a basic research project;

e. to provide the participants with the time, the materials, and the experienced staff to design, develop, and implement their own interdisciplinary environmental studies program in their classrooms. This will be accomplished by having the participants work as teams (one biology and one social science teacher) and by promoting free exchange of ideas among all participants;

f. to provide biology teachers with a first-hand experience in dealing with the social implications of science as viewed and considered by the social science teachers. Interaction between the two groups will be encouraged with the belief that each group has considerable insight to offer the other as common solutions to these basic problems of man are considered.

SELECTION CRITERIA AND PARTICIPANTS

Thirty-two secondary biology and social science teachers who wish to research the problems of their environment and who wish to design, develop, and implement programs for interdisciplinary environmental studies in their classrooms will be selected. Special consideration will be given to biology and social science instructors teaching at the same schools who wish to work together to design, develop, and implement such a program. We will expect teachers to have three years of teaching experience, although teachers with more limited experience will be selected if they plan to adopt such a program in the near future. Since very few teachers have been trained specifically in the areas of societal, ecological, and pollution problems, all teachers will need such institute training. The number of social science or biology teachers who have worked closely with the other group in such a project are probably nil.

No preference will be given to certain age groups or a given sex. There will be no discrimination as to race, color, or creed in making the selection of participants. A selection committee consisting of the Director and available members of the institute staff will evaluate the applications. Teachers with strong recommendations from their administrators attesting to their effectiveness as teachers will be preferred over those who have had an erratic record of teaching experience and unimpressive recommendations. Biology and social science teacher teams will be evaluated as one unit rather than separately so as to minimize problems with selection of one and eliminating the other. For the most part both members of the team will be selected or neither will be selected.

CREDIT

Each participant will receive eight semester hours of credit for successful completion of the institute courses. The courses will be numbered at the one hundred level and hence can be used for either graduate or undergraduate credit. The University has special degree programs for science and social science teachers should any of the participants wish to return to the University for additional work.

COURSES

ENVIRONMENTAL LABORATORY *credit: 6 hrs.*

This course will feature research into the three basic areas of environmental studies, namely societal, ecological, and pollution problems. Emphasis will be placed upon team (consisting of one biology and one social science teacher) research with selected research scientist advisers. Familiarization with the basic equipment, materials, and apparatus of the research scientist will be gained with this research experience. In this course the interdisciplinary teams will work independently with three or more selected research topics from such areas as population genetics, air pollution, sewage disposal, noise pollution, soil and water conservation, and similar topics arising from reading and seminar sessions.

There exists on and off the campus of The University of Iowa tremendous opportunities for cooperative research activities between research scientists, biology teachers, and social science teachers.

In this course it is planned that the three basic areas of environmental studies be researched by each team of participants. To facilitate this we have divided the six-week environmental laboratory course into two one-week sessions and two two-week sessions. Following is a description of the activities to be carried on in each section.

Introduction: Interdisciplinary Environmental Studies *(Week I)*

One morning session each will be conducted by recognized specialists in the main areas of concern. The afternoon sessions will primarily be used as a forum for discussion of the topics presented in the morning lectures. The final morning session of the week will bring together the three specialists for a panel discussion, hopefully to help the participant to see the interdisciplinary nature of the three topics.

Contemporary Problems of Society *(Week II)*

The morning sessions will be conducted by specialists in the field of contemporary problems of society. Topical lectures and discussions related to these issues will comprise the bulk of the morning sessions. Specific topics that will be included are genetic engineering, overpopulation, social economics, population control, drug abuse, legislative control, implications of chemical pollution in man, the interaction of science and society. These areas will serve as an important focus for the entire institute before the more informational sections two and three are pursued.

The afternoon sessions will involve team research participation in such areas as overpopulation, genetic engineering, pesti-

cides, drug abuse, birth control, etc. It is expected that the participant teams will identify a problem, research that problem, and ultimately draw some final conclusions.

Ecological Studies *(Weeks III and IV for 8 teams)*
(Weeks V and VI for 8 teams)

The teams will carry on an intensive two-week ecological study of a selected area or areas of Lake Macbride Field Campus. The groups will be encouraged to look at the forest community, the grassland community, and the aquatic community in order that each participant is at least generally familiar with these basic types of environmental communities. One of these three basic communities will be selected by the team as its basic research project in field ecology. The interaction and interdependence of all members of a community as well as the interaction of organisms with their environment will be exemplified. Special emphasis will be placed upon descriptive forces involving a natural environment.

Pollution Problems *(Weeks III and IV for 8 teams)*
(Weeks V and IV for 8 teams)

The morning sessions will involve specialists who will conduct lectures and discussions related to such issues as water, air, soil, food, and organismal pollution. Persons who have been actively involved with collecting data, registering concern, and involved in pollution research will have a special impact during these two weeks. This involvement will be devoid of the contemporary glitter and notoriety of too much of this consideration today. As in the preceding two chapters, the afternoon sessions will again involve teacher research participation in such areas as air pollution, sewage disposal problems, noise pollution, and water control. It is hoped that the sixteen participant teams made up of one biology and one social science teacher each will identify a problem, research the problem, collect the relevant information, and ultimately draw some final conclusions that are sound.

Instructors: Christensen and Staff

SEMINAR: INTERDISCIPLINARY ENVIRONMENTAL STUDIES *(Weeks VII and VIII)*

Credit: 2 hrs.

During the final two weeks of the institute the participant teams will cooperatively design and develop individual units to be taken back to their classrooms, hopefully for implementation. Much of the work up to this point will have involved research and discussion of the contemporary issues of modern American society. It is hoped that many of the ideas gained from specialist lectures, discussions, field trips, and research projects can be incorporated into meaningful and relevant units of study designed and developed by the participant teams for the students who will be participating in future Environmental Studies programs in the secondary schools represented by the participants. Every effort will be made to prepare materials that will ultimately involve students in collecting data, solving problems, and drawing tentative conclusions in the area of environmental pollution. We would like the teachers to involve the students in similar activities and discussions during the next academic year.

Instructors: Yager and Staff

PLANS AND AVAILABLE FACILITIES

a. *Formal Instruction.* The University has ample laboratories and classrooms that will be available for the institute participants. There will be an air-conditioned auditorium for group sessions. All of the faculties are well equipped and relatively up to date. The suggested environmental laboratory materials will be available as well as the regular materials for a science laboratory and for ecological research. The main library as well as the special departmental libraries will be available for participant use. The reference for use by the participants will be kept in the institute office where the teachers can check them out for their own use.

Class Schedule

Week I: Three separate presentations, one from each major area; an Interdisciplinary Seminar which involves staff from each major area (Monday-Friday 8:00 a.m.-5:00 p.m.).

Week II: Topical lectures and team research in contemporary problems of society (Monday-Friday 8:00 a.m.-5:00 p.m.).

Weeks III and IV: The participants will be divided into two groups, Group I and Group II.

Both groups (Lecture) Ecology problems
Group I Team research participation in ecological areas
Group II Team research participation in pollution problems

Weeks V and VI: (Monday-Friday 8:00 a.m.-5:00 p.m.)

Both groups (Lecture) Pollution problems
Group I Team research participation in pollution problems
Group II Team research participation in ecological areas

Weeks VII and VIII: Curricular Development and Concluding Seminar (Monday-Friday 8:00 a.m.-5:00 p.m.).

The instruction is planned to be informal, unconventional, and enthusiastic. We want to get to know the participants and to work with them as they prepare to teach Environmental Studies in secondary schools. Generally, the evening will be left free for preparation and study. The teachers will be encouraged to prepare as many materials as possible to take home for use in their daily teaching.

b. *Informal Instruction.* Optional discussions and tours will be planned for evenings. Also, there will be other activities as suggested by the participants to encourage group exchanges as well as informal exchanges between participants and staff. The special field trips to supplement classroom instruction should afford added opportunities for informal instruction. We will be aiming for as much and as active a student-professor exchange as possible.

c. *Recreation.* Ping-pong, bowling, billiards, a music room, dancing, and other games are available in the Iowa Memorial Union. The Union will be available for recreation for participants upon payment of fees for is-

suance of an ID card. The recreation facilities of the field house, including facilities for tennis, hand ball, volley ball, track, swimming, etc., will be available for the participants. The city operates a very fine municipal recreation program including facilities at City Park for swimming, picnicking, and the like. Group picnics are planned as well as softball contests and similar activities as desired by the participants. Facilities and administrative framework will be available for as much recreational activity as seems appropriate by the group. The University has a repertory theater during the summer as well as an opera and several musical concerts. With the exception of the opera, these will be available without additional charge other than the required activity fee which participants must pay.

d. *Housing and Eating.* Dormitory facilities for board and room will be available for all participants at a cost of $250 for the eight-week session for a double-room accommodation. It will be possible to utilize the dormitory dining service for some group picnics in place of the regular meals. The dormitories are relatively new and furnished very well. Rooms have private telephone service and daily maid service. The lounges are air-conditioned and will be available for some evening meetings. Joint lunches for men and women will be planned during the week. These sessions will be used for group announcements and other administrative purposes. Hence, it will be a required function for all. Of course, they should help in developing some group spirit. Since living together for purposes of encouraging group interaction is considered important, participants who choose to bring their families and find private housing will be required to eat the noon meal as well as other specially arranged meals with the entire group. They will be billed for these meal functions. If a teacher definitely prefers to bring his family, ample private housing is available. However, we feel that less can be accomplished when a teacher must also be concerned with daily family responsibilities. If a significant number of participants bring their families, special activities for this group will be planned.

APPLICATION

Initial application by teams can be accomplished by completing the following materials: 1) NSF application form, 2) special University form, and 3) two letters of recommendation from secondary-school administrators. It is strongly suggested that the team (one biology and one social science teacher) complete individual forms and submit them as a team, rather than individually. A stamped, self-addressed envelope should be sent with these forms to complete the application. After initial selections, applicants must complete University of Iowa admission forms, provide transcripts of previous college work, complete a physical examination form, and submit dormitory application forms and contracts. The transcript can be included with the initial application material if the applicant so desires.

Special fees will be collected from participants as follows:

Required of all Institute participants for coffee breaks, special refreshments, etc., and required University fees not provided by NSF. $10

Required of all participants not living in dormitories for noon lunches, special picnics, and other meals provided as part of the dormitory contract for most participants. $40

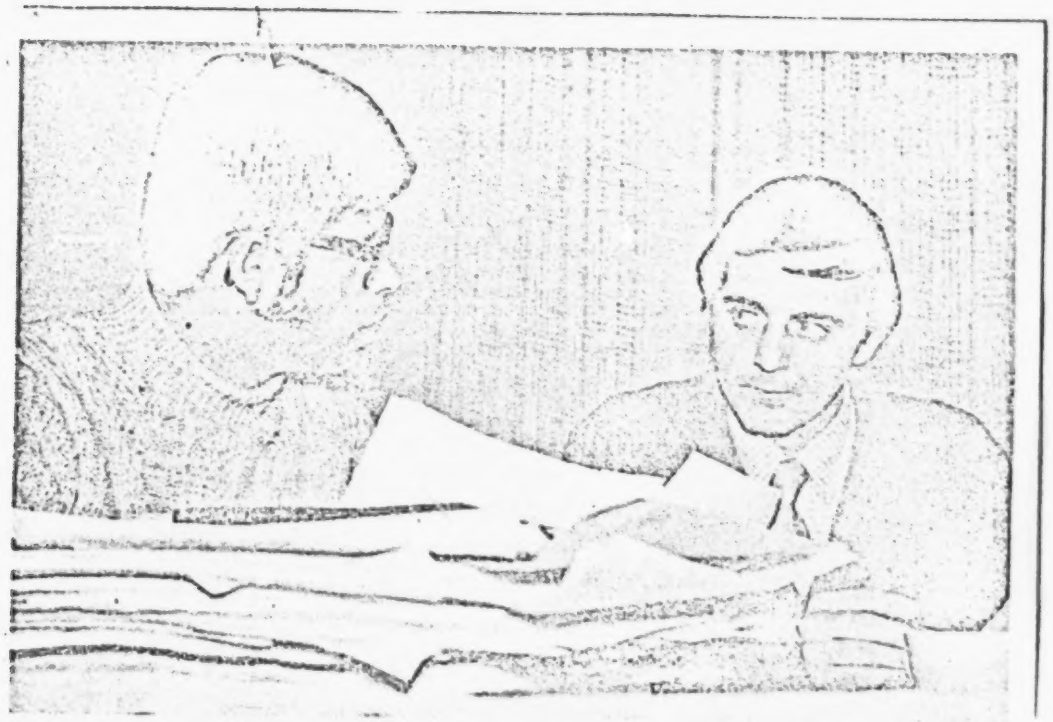
Stipend applicants from teachers must be postmarked by March 1, 1971, to guarantee consideration. Later applications may be reviewed if they are needed for a certain area or if such late applicants are significantly superior to alternates selected whose applications were received earlier. All initial stipend offers will be made by March 22, but not earlier than March 15, 1971. Applicants initially selected will have until April 5, 1971, to accept or decline.

In selecting individuals for participation and otherwise in the administration of the Institute, The University of Iowa will not discriminate on the ground of the race, creed, color, or national origin of any applicant or participant.

Application materials can be secured by requesting them from:

Dr. Robert E. Yager, Director
Interdisciplinary Environmental Institute
789 PRC II
The University of Iowa
Iowa City, Iowa 52240

Vol. 49, No.7, February 1971



Al Helgason (left) and Al Watson, two members of the Soprovich team, recently used the Society's library facilities at McMaster House to conduct some of the research related to the urban pollution project their team is undertaking under the auspices of Project Canada West.

MANITOBANS IN PROJECT CANADA WEST

Three Manitoba projects will be developed under the auspices of Project Canada West. They are being directed by teams of educators headed by Richard Harbeck, West Kildonan Collegiate, West Kildonan; D. Bruce Sealey, Faculty of Education, University of Manitoba, Winnipeg; and Bill Soprovich, Department of Youth and Education, Winnipeg. They will be conducted with the financial support of the Winnipeg, St. James-Assiniboia, St. Vital and Seven Oaks school divisions.

The Harbeck team will concentrate on the growth of Canadian cities. The project seeks to bring into the school, activities that will enable students to experience and understand the complexities of urban growth. Most activities will be designed for students in the first years of high school but may also be adapted for enrichment or use in other grades and with adults. The materials to be developed will focus on the historical evolution, the contemporary problems and the future growth of the urban center.

The Sealey project will produce printed materials to develop in white teachers and others working with people of Indian ancestry, a knowledge of Indian and Metis. It will also work out multi-media materials for students to develop their knowledge and appreciation of problems encountered by people of native ancestry. In addition, it will prepare a cross-cultural studies model.

Mr. Soprovich and his team will work on an inter-disciplinary approach to urban pollution. They will examine the problem as well as develop means whereby students may examine similar problems. Concentrating on the needs of grade X students who are not specializing in science, the study materials to be developed will be suitable for use throughout Canada.

Project Canada West, formally organized in 1970, concerns itself with the improvement of the teaching of Canadian studies. As theme, it has selected urbanization and urban life with emphasis on behavioral changes required to foster tolerance and understanding among Canadians in all parts of the country. Over 50 submissions were received by the committee charged with the examination of proposed studies. Of these, 14 – including the three Manitoba projects – have been selected for initial development.

The board of trustees – comprised of representatives of the Society, the Saskatchewan Teachers' Federation, the Alberta Teachers' Association, the B.C. Teachers' Federation and others – includes Society Director Kris Breckman and the Manitoba Department of Youth and Education representative, Michael P. Yakimyshyn. ©